City of Norfolk

Building Safety Division
Critical Inspection Checklist

Site, location and setback measurement according to approved plans:

1. Check the required setback for the building wall from all property lines or other buildings.
   Standard: Exterior walls must be at least 5 feet from property line or be rated one hour fire resistance per Section R302.1 and Table R302.1 {Note: More setback needed if zoning requirements are more stringent}
2. Address of the project is posted and clearly visible from the street or road.
   Standard: A legible address must be posted according to Section R321and the standard of the jurisdiction: The size of the numbers and letters and their location may be regulated. The IRC requires the letters to be 4 inches high with a stroke not less than ½ inch thick.
3. Check the required setback from any other easement.
   Standard: A structure may not be built on an easement. This includes electrical, water, information or sewer utility easement. An easement may be established to protect underground, surface or overhead utilities.
4. Check the orientation on the lot. Is the house *reversed*?
   Standard: The house must sit on the property as approved by Zoning and Building Departments. Anything different must be approved if changes are made.
5. Check for erosion control measures.
   Standard: A Jurisdiction may have erosion and sediment control laws. Siltation fence must be located around project where drainage would otherwise cause erosion.
6. Check for siltation control measures:
   Standard: A Jurisdiction may have erosion and sediment control laws. You may need to provide a method of preventing mud from getting into streets. This could be as simple as stone rip rap.
7. All adjoining property should be protected from construction materials.
   Standard: All adjoining property should be protected from construction debris as well as siltation and erosion.
8. Is site clean and free of construction-related garbage and debris?
   Standard: Jurisdictional Zoning ordinance or Neighborhood rules may establish maintenance of site conditions. Debris or trash may be regulated and required to be within an approved canister.
9. Will the building be required to be protected for flood resistant construction?
   Standard: If the land in a special flood hazard area established by Table R301.2 (1) mitigation is required. Requirements are specified in Section R324 and include elevating finish floor, flood resistant construction, flood venting and protection of mechanical and electrical equipment, and similar measures.
10. Is termite treatment control specified?
    Standard: If the land in a termite infestation area established by Table R301.2 (6), certain mitigation is required. Requirements are specified in Section R320 and include chemical treatment, use of preservative-treated wood, steel framing and physical barriers.
    Location of driveway with respect to street corners for traffic visibility and approved plans.
    Standard: The local jurisdiction may have a requirement may have additional requirement regarding location of driveway or curb cut to prevent motor vehicle accidents. Review standard for your driveway or curb cut.

Utility installations (Temporary service or initial connection)

1. Electric service panel and temporary electrical service connection. Is installation proper?

Standard: Electrical panel must be stable secure and electrical parts must be protected from weather. The height may be regulated by purveyor. Working clearance for service panel is 30" in width and 36" in depth and 6 feet 6 inches in height.

2. Water service meter connection, even for temporary use is regulated.

Standard: Installation standard is regulated by Water Company. Meter size is regulated by Chapter 29 and based on total water supply demand of dwelling. Cross connection control is required by Section P2902 and includes backflow protection.

3. Gas service line installation must be proper for pipe material and installation location.

Standard: Installation standard of gas meter is regulated by Gas Company. Pipe size is regulated by Section G2413 and based on total gas supply demand of dwelling. Installation standards including burial depth is specified by Section G2419.

4. Other utilities; Phone, Cable, etc. (important, though not inspected)

Standard: Standard is based on the Company's installation and workmanship requirements.

Underground drain, waste & vent (DWV) piping

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Proper materials for pipe: Is pipe identified with a label?

Standard: All drain, waste and vent pipe is required to be manufactured type and marked with identification per Section P2608. The label will indicate the type of pipe and its listing.

3. Proper use of DWV fittings? Improper use of sanitary tee?

Standard: DWV fittings are approved for use as listed and tested. Certain fittings may only be installed in a specific direction. For example, a sanitary tee must be installed in an upright direction and may not be installed *on its back*.

4. Sewer Tap connection: verify depth and proper tap: Is a location and depth drawing required? Is the appropriate fitting installed? Does the connection require a test?

Standard: Connecting to the public sewer is critical. The standard is set by the sewer purveyor (City or County). In order to facilitate repair in the future, a drawing may be needed to locate the connection fitting.

5. Is back water prevention required?

Standard: If sewer inlet is lower than nearest manhole, backflow prevention is required and must be installed to prevent accidental backflow. Section P3008 establishes this requirement.

6. Verify drain, waste and vent (DWV) size and placement.

Standard: DWV pipe system must be installed according to approved plan, Section P3005 and Table P3005.4.1 and Table P3005.4.2.

7. Verify proper support for pipe and protection from damage.

Standard: Section P2603 sets out requirements for protection. For DWV this includes protection from freezing. Section P2604 sets out trenching and backfilling standards. While underground, pipe must be protected against damage from stone or rock. A bed of sand may be needed to prevent such damage. Additionally, this includes backfilling.

8. Check the capacity of each vent based on fixture load.

Standard: Generally, the vent must be at least half the diameter of the drain pipe it serves. More specific requirements are in Section P3113.1. Various vent types are regulated throughout Chapter 31.

9. Check the capacity of each vertical and horizontal wet vent based on fixture load.

Standard: Minimum pipe size for vent is established based on fixture unit load in Table P3108.3.
10. Check DWV fittings for proper use and direction.
Standard: Ensure that DWV fittings are proper and installed in the correct direction.
11. Check horizontal pipe for required slope ¼ inch per foot).
Standard: Sewage must flow through gravity unless otherwise assisted. To facilitate this drainage, the pipe must be sloped at least ¼ inch per foot.
12. Check pipe's joint integrity. Is it water tight? Are there any leaks? Is water test provided for DWV? Is there a ten foot head test?
Standard: A test of the DWV pipe system must be provided to ensure that pipe is connected properly. The pipe system must be water-tight and not leak. A head of ten feet is required to ensure the proper pressure on the plumbing system per Section P2503. This test must last 15 minutes.
13. Check for cleanouts as required.
Standard: Cleanout fittings are required at different locations in the DWV system to facilitate the plumbers' ability to install a snake to clear a clog. Look for these locations based on approved plan and requirements of Section P3005.2. Generally a cleanout is required at the building drain and sewer and every 100 feet and at changes in direction exceeding 45º.
14. Verify proper trap arm sizes and slope.
Standard: Trap arms are limited in length according to fixture and trap arm length based on pipe size per Table P3105.1. Additionally, they must slope toward the vent either¼ or 1/8 inch per foot.
15. Verify proper water supply pipe material, size and distance to water meter.
Standard: Only certain pipe may be used for water supply. It must be identified with label indicating it use as water supply. The size is a function of the water pressure, demand and developed length. See approved plans and Section P2904.4 and Table P2904.4.
16. Verify the location of all plumbing fixtures, piping material, sizes and layout as intended.
Standard: Ensure that all plumbing drains are installed where they are expected to be. Measuring from exterior walls to centerline of plumbing fixture is the best way to do this. Section P2705.1 sets out other conditions for fixture installation variations.
17. Verify that water supply pressure is at least 40 pounds per square inch (PSI).
Standard: Use a water pressure gauge to verify the required minimum pressure set out by Section P2903.3.
18. Check that water supply pressure is less than a maximum of 80 pounds per square inch (PSI).
Standard: Section P2903.1 sets out maximum allowable pressure. Use a water pressure gauge to verify the required maximum pressure or provide a pressure reducing valve.
19. Check that pipe is protected from damage.
Standard: Pipe must be protected from damage to prevent breaking. This can be achieved in numerous ways. If there is rock or other abrasive material, it must be removed according to provisions of Section P2603.
20. Verify that pipes will be supported properly.
Standard: Pipe must have proper support as required by Section P2605 and Table P2605.1
21. ABS or PVC used in DWV system must be schedule 40.
Standard: Verify that pipe is schedule 40 by inspecting label on side per Section P3002.
22. Verify that drainage pipe fittings meet the standards for change of direction.
Standard: A fitting known as a *Bend* is used for change in direction of flow. These bends are identified along with their correct use in various changes in direction in Section P3005 and Table P3005.1.
23. Verify that drainage pipe size meet the limitations for maximum fixture units.
Standard: Pipe must be large enough to carry sewage from fixtures with different fixture unit capacities. See Table P3004.1 then P3005.4.1 and P3005.4.2 for requirements.

Underground water service pipe

1. Does water service connection meet Water Company's standards?

Standard: Review connection standards from Water Company. Some conditions that may affect connections include meter size, location on property, depth of connection, housing for meter and protection from freezing.

2. Water pipe system pressure test with no leaks?

Standard: Water supply pipe test must be at least system pressure per Section P2503.6. Look for leaks in water service pipe while test pressure of 160 psi (or system pressure if higher) is applied per Section 2904.4.

3. Check for proper burial depth of water supply pipe?

Standard: Water pipe must be protected from damage. Freezing can cause that damage. The pipe must be at least 12 inches below grade and 6 inches below frost line per Section P2603.6.1.

4. Check for proper materials to join non-metallic pipe.

Standard: Joints in pipe must be made with approved fittings and solvent cementing. Product listing on cement may include installation of a primer. Review product listing and ensure this is provided. Section P2608.3 establishes the requirement that all non-metallic pipe conform to NSF 14.

5. Check for proper materials for direct burial. Check for firmness of support and clean material used for bedding and backfilling of plumbing trenches and minimum cover.

Standard: Only proper materials are permitted to be used in water supply pipe buried underground. Review product listing and Section P2604 for conditions of support in underground locations.

6. Check the material for pipe installed under slab. Is it proper type? Are there fittings beneath slab?

Standard: Only certain pipe materials are permitted to be installed under a concrete slab per Section P2904.6. These include Type M Copper, Brass, Ductile Iron, PEX-AL-PEX, PE-AL-PE, CPVC, PB, PP and PEX. Fittings must be *approved type* and installed per the listing.

7. Is water supply pipe proper size?

Standard: Pipe size is based on developed length, water pressure and fixture unit value. Review approved plan and Table P2903.6 and P2903.7

8. Is water pipe installed under a slab shall have only approved joints. Section P2904.5.1

Standard: Only certain materials are permitted under slab. Joints must be approved type per manufacturer' listing and Section P2904.5.1.

Footing

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Check soil conditions: Is soil suitable to support structure?

Standard: Examine questionable soil conditions for stability Table R401.4.1 and Section R401.2 and 4. Is any fill material tested by soils engineer for compaction? Expansive or collapsible soil conditions need a soil report per Section R401.4.

3. Does project require a special inspection? Is the interim engineering report available for review?

Standard: If special inspection is required, you must ensure that this is performed and approved before you call for jurisdictional inspection. The Special Inspection may have conditions that specify some action by builder. The conditions for special inspection are specified in Chapter 17 of the IBC.

4. Are there exterior or interior bearing walls that require footings?

Standard: Exterior or Interior bearing walls must be supported by footings with dimensions that are according to Section R403.1 and Table R403.1.

5. Do General Notes on construction documents specify conditions?

Standard: Read every part of your plan. The General Notes are important. They tell the builder (that's you) about specifics of the contract agreed to by the architect or designer. The requirements for details on plans are in Section R106.1.1.

6. Is electrical ground connected to reinforcing steel in footing properly?

Standard: A ufer ground is one option for a grounding electrode system. The connection of the grounding conductor to the electrode must be made with an approved type clamp. Table E3503.1 specifies grounding conductor size and material.

7. Does finish floor height meet flood plain requirements?

Standard: In a special flood hazard area, the height of the finish floor is critical. Acquire this certification from licensed surveyor to ensure required height per Section R324.1.9.

8. Are roots and extraneous debris removed from bottom of trench?

Standard: No roots, wood or extraneous debris is permitted in footing trench. This will cause voids in concrete and result in a weaker footing. The requirement for footings to be supported on clean, natural soil or fill is in Section R403.1.

9. Verify width, depth, and thickness of proposed footing.

Standard: The footing size is based on load bearing capacity of the soil and the load imposed. Conventional parameters for footing width are located in Table R403.1.

10. If fill earth is used, is soil report complete?

Standard: A report on the successful compaction of fill material is characterized as *engineered fill* in Section R403.1. This report would indicate the degree of compaction and the suitability for support of a building.

11. Verify footing thickness with grade stakes, marks on the side of excavation or height of form boards.

Standard: In order to predict that the concrete pour will provide the required thickness of footing, a grade stake should be visible to mark the finish height of the footing. Measure this thickness and ensure that it is at least 6 inches per Section R403.1.1.

12. Verify that bottom of footing is level or properly stepped

Standard: The bottom of footing can slope a maximum of 1:10 without providing stepped footings per Section R403.1.5.

13. Verify that any required reinforcing steel is installed with proper size and lap, and separated from earth

Standard: Reinforcing steel provides tensile strength for concrete, which otherwise, has very little. The steel is required in seismic zones D_0, D_1 and D_2. The reinforcing bar size, center spacing and lap are specified in Section 403.1.3 and normally on the approved plans.

14. Does the concrete ordered for use have a minimum strength as required?

Standard: Required strength of concrete is between 2500 psi – 3500 psi depending weathering potential and type
or location of concrete construction. Section R402.2 points to Table R402.2 for minimum strength.

15. Is the concrete that will be exposed specified to be air-entrained?

Standard: Some conditions or type of concrete specify that concrete must be air-entrained. Table R402.2 footnote $_d$ points to four categories where this is required.

<u>Foundation walls or Masonry/Concrete Walls</u>

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Verify the height of the wall and the finish floor. Is reinforcing steel installed per plan? Vertical? Horizontal? Ties? Joint reinforcement?

Standard: Depending upon a foundation wall's type (concrete or masonry), height, unbalanced backfill, soil

characteristics it will require a prescribed minimum thickness, vertical or horizontal reinforcement per Tables R404.1.1(1), (2), (3), (4), and (5).

3. Check for proper lap in reinforcing steel.

Standard: Section R404.4.6 specifies standards for reinforcement for strength, placement and lapping by referring to ASTM and ACI standards. Generally, 40 bar diameters is sufficient for lap of reinforcement. For a #4 bar (½ inch diameter), the lap would be (40)(½) or 20 inches.

4. Verify the thickness of foundation wall block.

Standard: Tables R404.1.1(1), (2), (3), (4), and (5) sets out thickness requirements based on variables

5. Verify that wall is prepared for grout placement; cleanliness of cells and cleanouts.

Standard: Grout space must be free of debris and mortar projections larger than ½ inch per Section R609.1.3

6. Verify that required anchor bolts are on site and ready for installation as required.

Standard: Foundation anchorage that supports brace wall panels are required per Section R403.1.6. Generally, anchor bolts must be provided every 6 feet, within 12 inches of the end of a wall and at least two bolts per plate section. For seismic zones C, D_0, D_1 and D_2 other conditions apply per Section R403.1.6.1.

7. Does wall require a special inspection?

Standard: Under some conditions, the construction of a masonry, concrete, steel or wood wall requires Special Inspection per Chapter 17 of the IBC. This could include high strength concrete footing, unique masonry design,
specialty steel construction, complex wood framing or similar installations.

8. Are grout pours for masonry walls over five feet high? Are cleanouts provided?

Standard: Section R609.1.4 specifies limits for grout pours to five feet.

9. Check for required beam pockets?

Standard: Foundation walls support bearing walls, posts and beams. In some cases, these supporting elements may be secured within masonry walls. Section R606.14 specifies that beam support be at least 3” parallel to the beam and 4 inches in thickness and be solid masonry.

10. Will foundation wall be laterally supported?

Standard: There are five conditions that denote adequate lateral support for a foundation wall in Section R404.1. This includes restraining conditions at both the top and bottom of the foundation wall.

11. Verify that mortar head and bed joint are filled with mortar.

Standard: Mortar joint thickness is specified to be 3/8 inch thick in Section R607.2.1 for bed joints, head joints, and collar joints. For starter course bed joint can be between ¼ and ¾ inch. The tolerance for mortar joint thickness is specified in Section R602.7.2.1.

12. Is crawl space provided with adequate ventilation?

Standard: Enclosed foundations require ventilation according to Section R408. For every 150 ft^2 of floor area, 1 ft^2 of ventilation is required. Additionally, at least one vent must be within each corner of the building. This must be considered while building the foundation wall.

13. Does foundation require openings for flood ventilation?

Standard: Enclosed foundations require flood ventilation according to Section R324.2.2. For every $1ft^2$ of floor area, 1 in^2 of flood ventilation is required. Additionally, the vents must be within 1 foot of ground level. This must be considered while building the foundation wall.

14. For Insulated Concrete Walls (ICF’s), check thickness of form and reinforcement.

Standard: ICF wall systems may be used for foundation walls. There are three separate tables that allow the use of five separate types of ICF walls. Table R404.4(1) is 5.5 inch thick flat ICF wall systems. Table R404.4(2) is for 7.5 inch thick flat ICF wall systems. Table R404.4(3) is 9.5 inch thick flat ICF wall systems. Table R404.4(4) is for waffle grid foundation walls. Table R404.4(5) is for screen grid ICF wall systems.

15. Is adequate damp proofing provided for basement walls?

Standard: Foundations that retain earth and enclose interior spaces and floors below grade must be dampproofed. In areas with a high water table, foundations that retain earth and enclose interior spaces and floors below grade must be waterproofed. Section R406 details the methods for each.

Pre-Concrete placement (Slab) pour

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Is soil compacted properly?

Standard: Standard: Examine questionable soil conditions for stability Table R401.4.1 and Section R401.2 and 4. Is any fill material tested by soils engineer for compaction? Expansive or collapsible soil conditions need a soil report per Section R401.4.

3. Are there interior footings for bearing walls? Are they installed properly?

Standard: Standard: Exterior or Interior bearing walls must be supported by footings with dimensions that are according to Section R403.1 and Table R403.1.

4. Make sure that no water or sewage pipe is installed in direct contact with concrete?

Standard: Any pipe passing through or in direct contact with concrete is subject to damage or corrosion. Pipe must be wrapped with protective sheathing or wrapping or other means that will withstand the action of lime or acid of concrete, cinder or other corrosive material per Section R2603.3.

5. Is finish floor at the proper height?

Standard: Standard: If the land in a special flood hazard area established by Table R301.2 (1) mitigation is required. Requirements are specified in Section R324 and include elevating finish floor, flood resistant construction, flood venting and protection of mechanical and electrical equipment, and similar measures.

6. Is there a masonry fireplace that needs a footing?

Standard: Footing for masonry chimney must be at least 12 inches thick and extend at least 6 inches beyond the face of the foundation or support wall on all sides per Section R1003.2.

7. Are electrical conduits installed properly under slab?

Standard: Where subject to physical damage cable must be protected in the most appropriate manner. Section E3702.3.2 and Table E3701.4 delineates the type of conduit or cable necessary.

8. Verify the required thickness of the slab

Standard: Concrete slab on grade floors must be 3 ½ inches in thickness unless the soil is expansive in nature. Section R506.1 specifies thickness and compressive strength of concrete.

9. Is vapor barrier provided?

Standard: A 6 mil polyethylene or similar vapor retarder must be placed between the slab and the base course. Section R506.2.3 additionally specifies that joints must lap at least six inches.

10. Is termite proofing complete?

Standard: Where a site is within an area subject to damage from termites, treatment may include termiticide under slab. Section R320 specifies approved methods.

Floor and roof deck nailing inspection

1. Are the Jurisdiction's approved plans on site?

   Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Verify the species and grade type of lumber is correct?

   Standard: Load bearing dimensional lumber for joists, beams and girders must be identified by a grade mark (Example: Doug Fir #2) from an approved lumber grading or inspection agency per Section R502.1.

3. Verify the size and type of framing lumber is used correctly. (Example: 2X12s @16" O.C.)
Standard: Floor framing must meet the minimum standards for strength and span capacity as set out in Section R501.2 and various tables including R502.3.1(1), (2), (3), (4) for floor joists and (5 and (6) for girders and headers.
4. Verify that floor sheathing materials is adequate for span and is per plans.
5. Standard: floor decking is critical to stability of live load. Thickness and span rating are specified in Table R503.2.1.1(1). Look for panel span index (Example: 32/16) and verify it matches your joist span.
6. Verify staggered layout of panels and orientation is perpendicular to supports.
Standard: While the Code refers to manufacturer's installation instructions in Section R503.2 for wood structural panel sheathing and R503.3 for particleboard. In many cases, edge blocking, orientation and staggered joints are part of manufacturer's installation instructions.
7. Verify the condition of floor sheathing panel; look for de-lamination or excessive saw cuts.
Standard: The condition of the material is important in that it must not be damaged in order to do its job: passing live load to supporting elements below. References to manufacturer's installation standards and product material standards indicate that the wood structural panel sheathing or particleboard must be free of defects and in good condition.
8. Check nailing for floor panel sheathing: Look for number of nails and center spacing.
Standard: Depending upon material, panel sheathing must be installed with positive connections to framing elements (floor joists). The size, quantity and spacing of the connector must be according to Tables R602.3(1) and (2).
9. Joists under bearing partitions.
Standard: Joists under parallel bearing partitions must be adequate to support the load. Details are specified in Section R502.4. Bearing partitions perpendicular to joists must not be offset from supporting girders, walls or partitions more than the joist depth unless properly sized per Section R502.4.

<u>Shear wall installation inspection</u>

1. Are the Jurisdiction's approved plans on site?
Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.
2. Do brace walls segments match code requirements and approved plan for length and location?
Standard: Brace wall panels must be provided per Section R602.10; generally every corner and interval along a wall line per Table R602.10.1(1) for amount and location based on method, wind speed and seismic category.
a) Bracing requirements adjacent to garage doors or short wall sections
Standard: Reduction in brace wall panel length is permitted according to Section R602.10.3.2.1.
3. Do the materials for sheathing match code requirements and approved plans for type and thickness?
Standard: Table R602.10.1(1) set out the material conditions identified in Section R602.10.2.
4. Does the nailing of sheathing to wall frame match the Code requirements and approved plans for type and center spacing? Nail gauge? Screw size?
Standard: Tables R602.3(1), Table R602.10.1(1) set out the material conditions identified in Section R602.10.2 and minimum length of panels in Section R602.10.3.
5. Are connections between the shear wall section and the foundation installed according to plan? Hold downs? Foundation bolts?
Standard: For traditional shear walls with normal brace wall panels, Section R403.1.6 specified that anchor bolts spaced not more than 6' O.C. are adequate. For other types of brace wall systems including alternate braced wall panels according to Section R602.10.3.2.2 and Table R602.10.3.2.1.
6. Verify the required stud size and center spacing for shear walls. Is complete load path provided for shear

transfer?
Standard: Wall construction must be capable of transmitting all loads to supporting elements per Section R601.2. This involves shear wall panel connections to framing, hold-downs or anchor bolts, blocking, metal connectors between floor and roof framing and sometimes thrust blocks. Most of these should be referenced on the approved plan.

Rough-in Plumbing

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. DWV Pipe:

a) Verify drain, waste and vent (DWV) materials, size and placement

Standard: Verify that pipe materials are identified and proper for use. The size and placement of pipe are normally specified on plans. Both are regulated by the IRC Chapters 25 through 32.

b) Check the required size and capacity of each vent

Standard: Vents, generally, must be at least ½ the required diameter of the drain served per Section P3113.

c) Check horizontal pipe for required grade.

Standard: Section P3104 specifies that vent and branch vent pipes shall be graded, connected and supported to allow moisture and condensate to drain back to soil or waste pipe by gravity.

d) Test pipe joint integrity? Is water test provided? Is pipe water tight? Leaks?

Standard: There should be no visible leaks in DWV piping. Section P2503.5.1 specifies that there should be "No evidence of leakage" during inspection test.

e) Check for cleanouts as required

Standard: Cleanouts are required based on change of direction and length of pipe. Check plan for required locations. Section P3005.2 specifies some locations where required including every 100 feet and any change in pipe direction greater than 45º.

f) Verify trap arm length based on pipe size. Note the maximum trap arm length.

Standard: Table P3105.1delineates the maximum distance of fixtures trap from vent for common sizes of trap. Additionally, minimum slope for trap arm is specified.

f) Does vent size match required size serving drain pipe?

Standard: Table P3107.3 specifies minimum vent pipe size based on maximum fixture drain in drainage fixture units.

g) Check for required nail plates protecting pipe in wood framing member.

Standard: If bored or notched member provides less than 1 ½" from nearest edge of member, a nail plate or similar protection is required per Section P2603.3. Note that Structural Insulated Panels may be drilled and notched or altered according to Section R614.

h) Check for height of vent connection above fixture flood rims;

Standard: Minimum 6" above flood rim of fixture per Section P3104.5.

j) Check that vent termination:

1. Is the required distance below windows or other openings:

Standard: 4 feet per Section P3103.5.

2. Is the required distance away from a property line if extending through a wall.

Standard: 10 feet horizontally from the lot line per Section P3103.6.

k) Check for required exhaust ventilation for toilet rooms (or operable windows)

Standard: Mechanical ventilation exhaust equivalent to 50 cfm must be provided unless windows not

less than 3 ft² one half of which is openable per Section R303.3.

l) Check for required width of toilet area

Standard: Figure R307.1 and Section P2705.1 specifies that toilet must have an area of at least 30 inches in width.

o. Check that DWV vent pipe termination extends above roof

Standard: 12" above roof (Jurisdiction standard may be different).

p. Check that shower meets minimum size and shape requirements.

Standard: Showers must have at least 900 square inches and 30" in any dimension per Section P2708.1.

q. Verify that shower receptors are tested and hold water.

Standard: Section P2709 specifies installation standards. Pan should not leak.

r. Verify that water heaters are installed in proper location;

Standard: Can the water heater be serviced or replaced in current position according to Section P2801.5 and M1305?

3. Water distribution pipe.

a) Check that materials for water pipe are proper for use.

Standard: Label on pipe will indicate approved use. Look for potable water use label according to Section P2608.

b) Check for water pressure test at system pressure?

Standard: Are there any leaks at system pressure? Is air test pressure 50 psi? The test requires that pipe proves to be tight or hold pressure if an air test for 15 minutes per Section P2503.6.

c) Check for required nail plates protecting pipe in wood framing member.

Standard: If bored or notched member provides less than 1 ½" from nearest edge of member, a nail plate or similar protection is required per Section P2603.2.1.

d) Check for proper installation of backflow prevention devices.

Standard: Look for instances where potable water supply may be polluted from drainage pipe or standing water. Section P2503.7 specifies that backflow prevention devices be tested and inspected and operate properly. Test gauges require specific increments.

e) Verify that hot water is on the left-hand side of fixture.

Standard: Hot water valve must be on left side of faucet per Section P2722.2.

f) Verify that water heater has temperature and pressure relief valve to proper location.

Standard: Section P2803 specify that temperature and pressure relief valve must installed on water heater and extend to a safe location.

4. Gas Pipe

a) Check for proper support for gas pipe.

Standard: Based on material type and size, pipe must have support at various intervals per Table G2424.1.

b) Is gas pipe under proper test pressure?

Standard: Use test gauge to verify pressure is stable and pressure drop does not indicate a leak in gas pipe when test pressure is applied. The test pressure must be at least 1 ½ times the working pressure but not less than 3 psig per Section G2417.4.1.

c) Where is gas appliance located? Are they in proper rooms?

Standard: Certain rooms are prohibited locations per Section G2406.2. Bedrooms, bathrooms, toilet rooms, and storage closets are prohibited from gas appliances with some exceptions.

d) Do rooms with gas appliances have combustion air supply?

Standard: Except for direct vent and enclosed gas furnaces, all gas appliances must have adequate combustion air. They can get this from inside or outside. Section G2407 specifies requirements for combustion, ventilation and dilution air.

e) Verify that approved exhaust vents are provided for gas appliances.

Standard: All gas appliances must exhaust products of combustion to the outdoors per Section G2425.2. Except for direct vent and equipment with integral vents, most gas appliances must have exhaust vents per Section G2426.

f) Check for proper gas pipe size according to demand.

Standard: Calculate volume of gas demand based on fixtures connected to pipe. Gas demand is based on manufacturer's rating. Add up all demand on gas pipe and check adequate size. Section G2413 specifies requirements for pipe sizing.

g) Check for proper location of shut off valve for fireplace.

Standard: Normally within 6 feet, but may be within area remote from fireplace, but with access per Section G2420.5.

<u>Rough-in Mechanical equipment</u>

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Are adequate heating facilities provided?

Standard: If winter design temperature is below 60° F, verify that equipment can heat house to 68° F per Section R303.8.

3. Does mechanical equipment have proper clearances to walls and combustibles?

Standard: All clearances are normally established by the manufacturer of equipment and appliances. Some reduction in those clearances may be applied with specified forms of protection per Table G2409.2

4. Verify the listing on made up ducts, manufactured ducts and insulation materials.

Standard: Look for the independent third party testing and evaluation on product to ensure safe equipment. Unlisted appliances and equipment may be used, but have additional restraints on their use for safety. Section M1601.2. Duct insulation materials shall meet flame spread of 25 and smoke developed index not over 50 per Section M1601.3.

5. Verify adequate support for ductwork and that distribution boxes have support.

Standard: Metal ducts must be supported with ½ inch wide 18 gauge straps or 12 gauge galvanized wire at 10 foot intervals. Non-metallic ducts must be supported based on manufacturer's specifications. Installation requirements are according to Section M1601.3.

6. Make sure that factory made duct is not damaged or kinked or twisted to restrict air flow.

Standard: Look for excessively constricted air flow in flexible duct material. This could mean poor conditioned air supply and damaging equipment and creating a dangerous condition. Factory made ducts must be installed in accordance with manufacturer's installation instructions per Section R1601.2.

7. Verify that supply and return air ducts are the proper size as required and referenced on plans.

Standard: In order to provide the safest, most efficient design, the proper ducts must be installed. This is normally worked out in design stage, so review the plans and compare what is installed. Did the installer get it right? Section M1601.1 indicates that duct design that includes supply and return ducts be according to Air Conditioning Contractor's of America (ACCA) Manual D. Section M1602 specifies prohibited sources from which return air may not be drawn.

8. Verify the location for all required gas exhaust vents. Is the proper vent in place? Clearances? Protection against physical damage?

Standard: Gas exhaust exhausted through vents must be according to Section G2426 for vent application, connectors, shield, installation, support and protection against physical damage. As appliances are *roughed in*, their exhaust vents must be installed. The location, size and type of exhaust system is generally driven by the manufacturer. Use Section G2426 and the manufacturer's product installation instructions as a guide for the required vents.

9. Verify that vents are the proper type: B, BW, L, chimney, etc.

Standard: Table G2427.4 specifies the type of venting system to be used based on appliance served. For example, listed wall furnaces may use vents in wall cavities if they are a BW (B-Wall vent). Other categories have their respective type of venting system.

10. Verify that B vents have at least 1 inch clearance, are properly supported, and have proper slope?

Standard: B vents are manufactured and require a 1 inch clearance to combustibles.

11. Verify that other exhaust vents such as chimney flue vents have proper clearance to combustibles.

Standard: The clearance is generally established by manufacturer, but reduced clearances are as outlined in Table M1306.2.

12. Verify that appliances in garage are elevated above potential gasoline vapor.

Standard: Section M1307.3 specifies that appliances having an ignition source must be elevated such that the source of ignition is not less than 18 inches (457 mm) above the floor in garages.

13. Ensure drain and secondary drain is provided for cooling coils or evaporators that produce condensate. Verify that these are installed with proper materials and routed to an approved location.

Standard: Auxiliary or secondary drain is required where damage to building components will result from overflow of primary drain pan per Section M1411.3.1. Does the drain line have proper slope? If in attic, is second condensate drain provided that terminates to one of four approved methods that includes a conspicuous point of disposal?

14. Verify that any required access and working space will be provided when equipment is installed.

Standard: The width and depth for appliance access varies depending on appliance type and location. For more complete details, see Section M1305.

15. Verify that clothes dryer exhaust duct and termination is proper for materials, length and installation.

Standard: Section M1502 specifies that rigid metal ducts, (not flexible) are required to be the size specified by the manufacturer, and less than 25 feet in length with limited bends. Verify that no screens are installed at the duct termination.

16. Verify that attic used for HVAC equipment is adequately illuminated and has a service outlet.

Standard: Make sure that it has a switched light, service outlet and access platform and working clearance to equipment per Section M1305.1.2.

17. Verify that exhaust vents terminate properly above roof.

Standard: Exhaust vents must terminate above the roof according to Section M1804and the manufacturer's installation instructions. So, review the product listing and verify installation.

18. Is bathroom exhaust fan provided? Does it exhaust to the outdoors? Is there an operable window?

Standard: Bathrooms must have outside ventilation to carry vapors and odors away. Either a 3 ft^2 window with openings or an exhaust fan must be provided per Section R303.3. The window must open to half its area. If a vent, it must exhaust air directly to the outside.

19. Verify that conditioned air supply is provided in each room according to required volume, based on room size.

Standard: Mechanical ventilation system must provide air changes at the rate of .35 air changes per hour or a whole house ventilation system must be installed which provides 15 cfm of outdoor air. Section R303.1 specifies the requirements.

20. Verify that joints and seams in ducts are installed properly.

Standard: Section M1601.3.1 sets out the standard that joints and seams in duct systems must be substantially airtight with tapes, gaskets and mastics per Section M1601.3.1.

Rough-in Electrical wiring

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Verify electrical layout per approved plan; lights, outlets, switches and service equipment

Standard: The plan will indicate where every switch, light and outlet is planned. Look for these in the construction work during this stage. {Insert Figure E3801.2 for outlet spacing}. Outlets must be installed along a wall space within 6 feet of a break in a wall and every 12 feet. See Figure E3801.2 for more detail.

3. All electrical outlet, switch and light boxes must be identified with manufacturer and product listing.

Standard: There should be no home-made electrical components. They should all be factory made and have a listing such as UL. Section E3304.10 specifies that "…equipment be identified with manufacturer's name, trademark or other descriptive marking…"

4. Verify that lights in closets have proper clearance to shelving.

Standard: <Insert Figure E3903.11> Because closet storage results in accidental damage to luminaries, installation of luminaries is limited to certain space around the closet. See Figure E3903.11 for clarification.

5. Verify that wire size and type is correct size for installation.

Standard: Based on location, environmental conditions, and application, the type of wire is regulated by Table E3701.4 and E3605.1. Additionally, the size and type of wire, temperature rating, and material, the wire is limited to the ampacity set out in Table E3605.1.

6. Verify that NM cable in stud wall frames is protected from damage.

Standard: Protective plates are provided if wire is within 1 ¼" inch from edge of stud. Table E3702.1 specifies that a 0.0625 inch steel plate protect the cable from the outside of the stud.

7. Verify that smoke detectors are installed properly

Standard: Smoke detectors must be provided where required. They must be interconnected and hard wired to building power. Requirements are noted in Section R313.

8. Verify that fan boxes are listed for use.

Standard: Ceiling fans are heavy and must be installed with proper support and wiring capacity. Look for identification on fan outlet box where these will be installed. Section R3303.3 specifies that "…all electrical materials, components, devices, fixtures, and equipment must be listed for the application …" Section E3805.9 further specifies conditions for boxes at fan outlets.

9. Check for improper box fill: (too many wires inside outlet box).

Standard: Volume allowance is calculated using Table E3805.12.1 based on size of each conductor. Verify that the listed box has this volume.

10. Make sure that metal boxes are grounded properly

Standard: Metal outlet or light boxes must be grounded with grounding connection to box with green grounding screw. Section E3805.2 is the reference for this code requirement. Additionally, if face plate is metal it must be grounded as well per Section E3806.10.

11. Make sure that grounds are tied together with proper connector

Standard: E3808 sets out conditions for grounding. Ground wires must be electrically tied together with proper connector listed for this use. A crimped fitting is the most common method.

12. Ensure that neutral wires are tied together with proper connection.

Standard: Neutral wires must be electrically tied together with proper connector listed for this use. A compression fitting is the most common method. Article 300-13 NEC requires that the continuity of the grounded conductor (neutral) cannot depend upon the device connections (lampholders, receptacles, etc).
13. Verify free conductor length outside of outlet or switch boxes.
Standard: Secure wires within 6" of outlet box to framing member per Article 300-14 NEC.
14. Make sure that #12 wire is installed for 20 amp circuits in kitchen.
Standard: Two, separate 20 amp appliance circuits are required in kitchen. These must be fed with #12 gauge wire. Check for required island outlets. Section E3603.2 establishes that two separate 20 amp circuits be provided in kitchen and dining area. Table E3605.1 establishes required conductor size based on wire type and conductor temperature rating.
15. Check for required separate laundry circuit (20 amp circuit using #12 wire).
Standard: A single 20 amp laundry circuit is required for washing machine. This needs to be fed with #12 gauge wire. Section E3603.3 requires that a 20 amp circuit be provided for a receptacle in the laundry area. Table E3605.1 establishes required conductor size based on wire type and conductor temperature rating.
16. Make sure that no pendant fixtures or similarly suspended lights or fans are installed over bath or shower
area. Section E3903.10 sets out further requirements.
Standard: Unless listed, no light may be inside shower. No pendant fixture is permitted.
17. Verify that exterior outlets are provided as required outside.
Standard: An outlet is required at grade level and not more than 6 feet 6 inches above grade, both in front and rear of house in Section E3801.7.
18. Verify that any metal water pipe is bonded with proper clamp and is accessible.
Standard: Metal pipe must be bonded to electrical grounding system according to Section E3509.6.
19. Verify that outlet placement in bathroom lavatory is correct.
Standard: If there are two basins in a bathroom, an outlet or outlets must be positioned so that a cord being used by a person at one basin does not cross the other's basin according to Section E3801.6 and within 36 inches of the outside edge of each basin.
20. Verify that working clearance and access for energized equipment and panelboards is provided.
Standard: Electrical equipment and panelboards must be serviced periodically. For that reason, a working clearance must be provided. For most normal voltage purposes, there must be a working clearance of at least 30 inch width and 36 inch depth and 6 feet 6 inches in height where no other obstruction may be positioned.
21. Verify that conductors within plenums are rated for that use.
Standard: The insulation on conductors can deteriorate when subjected to heat and blown air. Certain cables are not permitted within plenums. Article 300-22 NEC establishes the conditions for wiring within plenums used for environmental air.
25. Verify that cable or conductors are not installed in concrete, cinder block or adobe unless they are approved for that use.
Standard: Cable or conductors are design for specific use and some will deteriorate if installed within masonry. Table E3701.4 establishes the allowable applications for wiring methods based on a variety of locations.
26. Make sure that motors are accessible and ventilated if required by manufacturer.
Standard: Motors may require a ventilated space to retard heat build-up and allow the motor to maintain a consistent temperature. Article 430.13 in the NEC sets out the conditions for motor ventilation and accessibility for motor service and replacement.
27. Note certain limitations for installation of NM cable.

Standard: NM cable, most commonly manufactured as ROMEX, is generally limited to uses within a building's wall frame system. Tables E3701.4 restricts the use of NM cable and Table E3702.1 sets out general installation requirements and support necessary for NM cable (and others).

28. Is a GFCI protected circuit provided as required in the house?

Standard: GFCI protection is required for bathrooms, kitchen, garage, outdoor locations, crawl spaces, laundry, unfinished basements, bar sink receptacles, boat hoists, and electrically heated floors according to the provisions of section E3802.

29. Is an AFCI protected circuit provided as required in the house?

Standard: AFCI protection is required for bedrooms according to the provisions of section E3802.12.

30. Is outlet spacing along kitchen counter proper?

Standard: Outlets are required every 4 feet and at every counter space 12 inches in width. Island counter spaces and peninsular counter spaces must be provided with outlets as well as clarified in Figure E3801.4.

31. Check for proper support for wire.

Standard: NM Cable must be supported every 4 ½ feet according to Table E3702.1.

Final Frame installation

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Verify that all other utility inspections have been approved by inspector(s).

Standard: Previous inspections must have been approved before calling for subsequent inspections, and certainly before covering work. Section R109.4 specifies that "Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the building official.

3. Are all framing components connected properly?

Standard: Everything that relies on a connection for structural integrity must be fastened together properly and load path. Section R301.1 states, "The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation."

4. Are all joists, girders, headers and beams installed correctly according to allowable span and imposed load?

Standard: Verify that all structural members match the approved plan for size and location within structure. Section R502.2.1 states in part: "A load path for lateral forces shall be provided between floor framing and braced wall panels located above or below a floor".

5. Are all structural members installed plumb?

Standard: Look for improperly installed structural members. Unless designed to do so, all structural members must be installed true and plumb. Section 404.5 states in part: "All foundation walls shall be maintained plumb and free from open cracks and breaks and shall be kept in such condition so as to prevent the entry of rodents and other pests."

6. Check for excessive cutting and notching of framing members.

Standard: floor, wall and roof framing elements are limited to a maximum cutting notching and drilling. Figure R502.8, Figure R602.6(1), and Section R802.7.1 specify maximums for floor, wall or roof framing elements.

7. Verify wall corner construction; look for overlap connections. Verify that intersecting walls are properly supported.

Standard: Normally, a minimum of three studs are required at an intersection or corner per Figure R602.10.5.

8. Verify that lateral bracing is installed properly and installed in locations according to the Code and approved plan.

Standard: Section R602.10 specifies where lateral bracing is required and based design loads (wind or seismic), the braced wall method, the architectural application and other conditions.

9. Verify that any required bridging is installed.

Standard: Based on the depth of joist, mid-span blocking may be required. Joists larger than 2 X 12s must have bridging or blocking at 8 foot intervals. For blocking and bridging of floor joists, Section R502.7 specifies conditions. For blocking and bridging of roof rafters and joists, Section R802.8 specifies that lateral support and bridging must be provided in certain conditions.

10. Verify that all wall openings (doors and windows) are where intended or required).

Standard: This is both an architectural and structural requirement. Field conditions must match the approved plan and Code requirements. Section R303 establishes requirement for natural lighting and ventilation for each habitable room. Section R303.3 specifies ventilation for bathrooms. Section R308 specifies the locations regarded as hazardous for glazing. If window is in these areas, they need to meet safety glazing standards. Section R311 establishes the requirement for means of egress from a building or space within. Door's minimum size and type are established. Section R310 establishes the requirement for an emergency egress opening from a sleeping room. Four criteria must be met including size and placement of window.

11. Make sure that rise and run for stairs is correct.

Standard: A maximum of 7 ¾ inch rise and a minimum 10 inch run is required as required by Section R311.5.3.

12. Check if each rise/run has no more than a 3/8" variation for both tread depth and riser height.

Standard: Each rise and run can vary a bit, but no more than 3/8 inch maximum per Section R311.8.3.1.

13. Check for required headroom in stairs and hallways.

Standard: Per Section R311.8.2 establishes that 6 foot 8 inches is the minimum ceiling headroom required for stairs. The measurement is based on distance vertically from the sloped plane of the tread nosings.

14. Check for required width for stairs and hallways.

Standard: Minimum width for stairs is 36 inches. Handrail are permitted to encroach 4 ½ inches per Section R311.8.1.

15. Verify that the overall height of the building is per plan.

Standard: Height of a building is both an architectural and structural issue. It may also be a zoning concern. Section R101.2 limits the scope of the IRC to buildings that are three stories or less.

16. Verify that attic access is provided and meets the minimum size requirements.

Standard: Attics are more than a place to store Christmas decorations. Water supply pipe, sewage vents, gas exhaust vents, supply and return air ductwork, mechanical equipment, electrical wiring, as well as insulation can be in an attic. Proper access is required. Section R807 provides that: "Buildings with combustible ceiling or roof construction shall have an attic access opening to attic areas that exceed 30 square feet (2.8 m2) and have a vertical height of 30 inches (762 mm) or more. The rough-framed opening shall not be less than 22 inches by 30 inches (559 mm by 762 mm) and shall be located in a hallway or other readily accessible location. A 30-inch (762 mm) minimum unobstructed headroom in the attic space shall be provided at some point above the access opening. See Section M1305.1.3 for access requirements where mechanical equipment is located in attics."

17. Verify that sills or sleepers that rest on concrete are pressure treated or otherwise approved.

Standard: In order to retard insect infestation and deterioration of bottom plate, it must be of the type to resist decay. A pressure treatment is required unless the species of the wood naturally resists decay. Section R319 specifies conditions for wood framing that rests on concrete.

18. Verify that anchor bolts are installed and according to plan

Standard: Bolts must be not less than 6 feet apart (2 bolts per piece), within 12" of ends and 2 bolts per piece. Make sure that all anchor bolts are tightened and have washers.

19. Make sure that wall frame and roof structure is properly connected together.

Standard: Based on seismic and wind conditions, a roof system can separate from a wall system unless connected properly. The industry standard is to install metal connectors between wall frame and every roof trusses. Section R301.1 states, "Buildings and structures, and all parts thereof, shall be constructed to safely support all loads, including dead loads, live loads, roof loads, flood loads, snow loads, wind loads and seismic loads as prescribed by this code. The construction of buildings and structures in accordance with the provisions of this code shall result in a system that provides a complete load path that meets all requirements for the transfer of all loads from their point of origin through the load-resisting elements to the foundation."

20. Check for required fire blocking throughout. Can smoke move, concealed inside a wall frame, staggered studs, framing, soffits, drop ceilings, stair stringers, vent penetrations and chimneys?

Standard: All holes and penetrations in wall frame must be blocked to prevent smoke from entering attic. The materials include wood, wood structural panels, batts or blankets of mineral wool or glass fiber. Section R602.8 specifies the requirement for fireblocking and acceptable materials and placement.

21. Check for required structural blocking at points of bearing.

Standard: Floor joists must be blocked at points of bearing. Roof framing with a depth-to-thickness ratio over 5-1 must be provided with blocking at points of bearing. Trusses must be blocked per manufacturer specifications. For floor joists, Section R502.7 states, "Lateral restraint at supports.

Joists shall be supported laterally at the ends by full-depth solid blocking not less than 2 inches (51 mm) nominal in thickness; or by attachment to a full-depth header, band or rim joist, or to an adjoining stud or shall be otherwise provided with lateral support to prevent rotation.". For roof framing, Section R802.8 states, "R802.8 Lateral support.

Rafters and ceiling joists having a depth-to-thickness ratio exceeding 5 to 1 based on nominal dimensions shall be provided with lateral support at points of bearing to prevent rotation.

R802.8.1 Bridging.

Rafters and ceiling joists having a depth- to-thickness ratio exceeding 6 to 1 based on nominal dimensions shall be supported laterally by solid blocking, diagonal bridging (wood or metal) or a continuous 1-inch by 3-inch (25 mm by 76 mm) wood strip nailed across the rafters or ceiling joists at intervals not exceeding 8 feet (2438 mm)."

22. Verify that manufactured trusses are installed correctly: Review sealed calculations & drawings.

Standard: An engineered design for trusses will specify conditions for installation. Installation standards will be listed by truss manufacturer and include allowable loading, required bearing points, and permanent bracing. Section R802.10 specifies that "Truss design drawings, prepared in conformance to Section R802.10.1, shall be provided to the building official and approved prior to installation. Truss design drawings shall include, at a minimum, the information specified below. Truss design drawing shall be provided with the shipment of trusses delivered to the jobsite.

1. Slope or depth, span and spacing.
2. Location of all joints.
3. Required bearing widths.
4. Design loads as applicable.

4.1.Top chord live load (as determined from Section R301.6).
4.2.Top chord dead load.
4.3.Bottom chord live load.
4.4.Bottom chord dead load.
4.5.Concentrated loads and their points of application.
4.6.Controlling wind and earthquake loads.

5.Adjustments to lumber and joint connector design values for conditions of use.

6.Each reaction force and direction.

7.Joint connector type and description (e.g., size, thickness or gage) and the dimensioned location of each joint connector except where symmetrically located relative to the joint interface.

8.Lumber size, species and grade for each member.

9.Connection requirements for:
9.1.Truss to girder-truss.
9.2.Truss ply to ply.
9.3.Field splices.

10.Calculated deflection ratio and/or maximum description for live and total load.

11.Maximum axial compression forces in the truss members to enable the building designer to design the size, connections and anchorage of the permanent continuous lateral bracing. Forces shall be shown on the truss design drawing or on supplemental documents.

12.Required permanent truss member bracing location.

23. Verify that I joists are installed per manufacturer's specifications.

Standard: Manufactured I joists must be installed according to their design. Any cutting, notching or drilling must meet the manufacturer's approvals. Section R802.7.2 says, "Cuts, notches and holes bored in trusses, structural composite lumber, structural glue-laminated members or I-joists are prohibited except where permitted by the manufacturer's recommendations or where the effects of such alterations are specifically considered in the design of the member by a registered design professional."

24. Look for minimum size of habitable rooms, hallways and stairs.

Standards: Habitable rooms must meet minimum size to be safe and sanitary. Section R304 specifies that: "Every dwelling unit shall have at least one habitable room that shall have not less than 120 square feet (11 m2) of gross floor area. Other habitable rooms shall have a floor area of not less than 70 square feet (6.5 m2). Exception: Kitchens." Section R304.3 provides for Minimum dimensions: "Habitable rooms shall not be less than 7 feet (2134 mm) in any horizontal dimension. Exception: Kitchens."

25. Based on location, verify that any required safety glazing is installed (or will be).

Standard: Section R308.4 details a list of hazardous locations. If glazing is within these areas, safety glazing is required per Section R308.3.

26. Verify that all required exterior wall flashing is installed correctly.

Standards: For exterior walls, Section R703.1 states in part: "The exterior wall envelope shall include flashing as described in Section R703.8. The exterior wall envelope shall be designed and constructed in a manner that prevents the accumulation of water within the wall assembly by providing a water-resistant barrier behind the exterior veneer as required by Section R703.2 and a means of draining water that enters the assembly to the exterior".

27. Verify that top plates in a wood wall frame are doubled and ends are offset at least 24"

Standard: Section R602.3.2 states in part: "Wood stud walls shall be capped with a double top plate installed to provide overlapping at corners and intersections with bearing partitions. End joints in top plates shall be offset at least 24 inches (610 mm)."

28. Check fireplace for following requirements:

a. Flue liner installed in masonry chimney

Standards: Section R1003.11 specifies materials permitted: “Masonry chimneys shall be lined. The lining material shall be appropriate for the type of appliance connected, according to the terms of the appliance listing and manufacturer’s instructions.”

b. Smoke chamber size and materials

Standards: Section R1001.8 sets out requirements for smoke chamber, “Smoke chamber walls shall be constructed of solid masonry units, hollow masonry units grouted solid, stone or concrete. Corbelling of masonry units shall not leave unit cores exposed to the inside of the smoke chamber. When a lining of firebrick at least 2 inches (51 mm) thick, or a lining of vitrified clay at least 5/8 inch (16 mm) thick, is provided, the total minimum thickness of front, back and side walls shall be 6 inches (152 mm) of solid masonry, including the lining. Smoke chamber dimensions are addressed in Section R1001.8.1 that says, “The inside height of the smoke chamber from the fireplace throat to the beginning of the flue shall not be greater than the inside width of the fireplace opening.

c. Hearth dimensions as required based on fireplace size.

Standards: Section R1001.9 specifies that “Masonry fireplace hearths and hearth extensions shall be constructed of concrete or masonry, supported by noncombustible materials, and reinforced to carry their own weight and all imposed loads. No combustible material shall remain against the underside of hearths and hearth extensions after construction. Section R1001.9.1 specifies that the minimum thickness of fireplace hearths shall be 4 inches (102 mm).

d. Chimney height above roof

Standards: Section R1003.9 states in part: “Chimneys shall extend at least 2 feet (610 mm) higher than any portion of a building within 10 feet (3048 mm), but shall not be less than 3 feet (914 mm) above the highest point where the chimney passes through the roof.”

e. Clearances to all combustibles and Manufacturer’s specifications

Standard: Section R1001.11 states in part: “All wood beams, joists, studs and other combustible material shall have a clearance of not less than 2 inches (51 mm) from the front faces and sides of masonry fireplaces and not less than 4 inches (102 mm) from the back faces of masonry fireplaces. The air space shall not be filled, except to provide fire blocking in accordance with Section R1001.12.”

<u>Pre-Insulation pickup</u>

1. Are the Jurisdiction’s approved plans on site?

Standard: The Jurisdiction’s approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Garage to house separation?

Standard: ½” drywall is required between house and garage per Section R309.

3. Door requirements:

Standard: 1 3/8” solid wood door or a solid or honeycombed steel door 1 3/8” thick door or 20 minute rated fire door is required between house and garage per Section R309.1.1

4. Duct penetrations protected

Standard: Ducts penetrating garage separation wall must be 26 gauge sheet steel or other approved material and have no openings into garage per Section R309.1.2.

5. Electrical boxes in separation walls or floor ceiling assemblies

Standard: Electrical boxes or other openings must be sealed according to provisions of Section R309.1.3 that states, “Penetrations through the separation required in Section R309.2 shall be protected by filling the opening

around the penetrating item with approved material to resist the free passage of flame and products of combustion."

6. Is fireblocking complete?

Standard: Double check all required fireblocking. {This is the most common reason for rejection at this stage}. Section R602.8 specifies: "Fireblocking shall be provided to cut off all concealed draft openings (both vertical and horizontal) and to form an effective fire barrier between stories, and between a top story and the roof space. Fireblocking shall be provided in wood-frame construction in the following locations.

1. In concealed spaces of stud walls and partitions, including furred spaces and parallel rows of studs or staggered studs; as follows:
    1.1. Vertically at the ceiling and floor levels.
    1.2. Horizontally at intervals not exceeding 10 feet (3048 mm).
2. At all interconnections between concealed vertical and horizontal spaces such as occur at soffits, drop ceilings and cove ceilings.
3. In concealed spaces between stair stringers at the top and bottom of the run. Enclosed spaces under stairs shall comply with Section R311.2.2.
4. At openings around vents, pipes, ducts, cables and wires at ceiling and floor level, with an approved material to resist the free passage of flame and products of combustion.
5. For the fireblocking of chimneys and fireplaces, see Section R1003.19.
6. Fireblocking of cornices of a two-family dwelling is required at the line of dwelling unit separation.

Materials permitted for fireblocking are specified in Section R602.8.1.

<u>Insulation & Energy Code</u>

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Are proper materials installed?

Standard: Only approved materials may be used as insulation materials. Section N1101.4 specifies that "An R-value identification mark shall be applied by the manufacturer to each piece of building thermal envelope insulation 12 inches (305 mm) or more wide."

3. Are all windows & doors installed according to the energy standards required on the approved plan?

Standard: Windows and doors must meet the energy standards for your climate zone. They will be identified with a label indicating a *U* value. Check this against the approved plans and Table N1102.1.

4. Is there an insulation certificate available (or required) to certify compliance with installation?

Standard: The installer must leave you a certificate indicating that the insulation has been complete. This certificate will indicate the type and value of the insulation. Section N1101.4 states in part: "Alternately, the insulation installers shall provide a certification listing the type, manufacturer and R-value of insulation installed in each element of the building thermal envelope."

5. Are all exterior walls insulated?

Standard: Verify that the walls are insulated properly according to your climate zone per Table N1102.1.

6. Is Ceiling or attic insulated?

Standard: Verify that the ceiling and attic are insulated properly according to your climate zone per Table N1102.1.

7. Is floor or crawl space insulated?

Standard: Verify that the crawl space is insulated properly according to your climate zone per Table N1102.1.

8. Is vapor barrier installed?

Standard: A vapor barrier is required to be installed on the warm-heating side of the insulation. Section N1102.5 states in part: "The building design shall not create conditions of accelerated deterioration from moisture condensation. Above-grade frame walls, floors and ceilings not ventilated to allow moisture to escape shall be provided with an approved vapor retarder. The vapor retarder shall be installed on the warm-in-winter side of the thermal insulation."

9. In attic, are baffles provided at soffit ends to facilitate required ventilation.

Standard: To facilitate attic ventilation, on eave or cornice vents, a 1 inch clearance is required. Baffles are one approved way to help provide this. Section R806.3 specifies that: "Where eave or cornice vents are installed, insulation shall not block the free flow of air. A minimum of a 1-inch (25 mm) space shall be provided between the insulation and the roof sheathing and at the location of the vent."

10. Is flexible duct for supply and return air insulated to R5?

Standard: Ductwork must be insulated per Section N1103 that states in part: "N1103.2.1 Insulation. Supply and return ducts shall be insulated to a minimum of R-8. Ducts in floor trusses shall be insulated to a minimum of R-6."

<u>Siding and veneer installation</u>

1. Are the Jurisdiction's approved plans on site?

Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Is the exterior covering is properly installed according to the approved plans?

Standard: Verify that exterior covering matches the approved plans and is installed properly per Section R703.

3. Is there proper attachment between weather resistant siding and wall frame?

Standard: Nails? Screws? Staples? Check center spacing. {Insert Table R703.4}

4. Is veneer properly connected to wall frame with structural ties?

Standard: a) Masonry veneer installation: Section R703.7 and Table R703.7(1).
b) Weep holes installed per Section R703.7.6.
c) Brick ties installed properly per Section R703.7.4.

5. Proper installation of EIFS systems

Standard: EIFS is a manufactured veneer system and as such MUST be installed according to the product listing per Section R703.9. Note that Special Inspection is required for EIFS systems per Chapter 17 IBC.

6. Proper installation of Stucco systems

a) Lath per Section R703.6 that states, "All lath and lath attachments shall be of corrosion-resistant materials. Expanded metal or woven wire lath shall be attached with 1½-inch-long (38 mm), 11 gage nails having a 7/16-inch (11.1 mm) head, or 7/8-inch-long (22.2 mm), 16 gage staples, spaced at no more than 6 inches (152 mm), or as otherwise approved."
b) Plaster per Section R703.6.2 that states, "Plastering with portland cement plaster shall be not less than three coats when applied over metal lath or wire lath and shall be not less than two coats when applied over masonry, concrete, pressure-preservative treated wood or decay-resistant wood as specified in Section R319.1 or gypsum backing. If the plaster surface is completely covered by veneer or other facing material or is completely concealed, plaster application need be only two coats, provided the total thickness is as set forth in Table R702.1(1). On wood-frame construction with an on-grade floor slab system, exterior plaster shall be applied to cover, but not extend below, lath, paper and screed. The proportion of aggregate to cementitious materials shall be as set forth in Table R702.1(3).
c) Weep Screeds per Section R703.6.2.1 that states in part: "A minimum 0.019-inch (0.5 mm) (No. 26 galvanized sheet gage), corrosion-resistant weep screed or plastic weep screed, with a minimum vertical attachment flange of 3½ inches (89 mm) shall be provided at or below the foundation plate line on

exterior stud walls in accordance with ASTM C 926. The weep screed shall be placed a minimum of 4 inches (102 mm) above the earth or 2 inches (51 mm) above paved areas and shall be of a type that will allow trapped water to drain to the exterior of the building. The weather-resistant barrier shall lap the attachment flange. The exterior lath shall cover and terminate on the attachment flange of the weep screed."

7. Proper installation of manufactured siding
Standard: Check manufacturer for required center spacing of framing members and the size and type of attachment required per Table R703.4.
8. Is building paper installed for weather protection?
Standard: Table R703.4 specifies if a water-resistive barrier is required (or not) for a variety of siding material types.

Roofing material underlayment (Dry-in)

1. Are the Jurisdiction's approved plans on site?
Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.
2. Is proper roof material installed according to approved plans? And slope?
Standard: Roofing material must be installed according to its intended use and slope. Product listing will indicate the required slope and installation requirements. Section R905 specifies the requirements for roof covering materials and installation conditions. In addition to these empirical standards, the product manufacturer will have additional standards of installation. These are also code requirements. Section R905.1 states, "Roof coverings shall be applied in accordance with the applicable provisions of this section and the manufacturer's installation instructions."
3. Is underlayment installed according to the product listing for roofing material?
Standard: Normally, underlayment is specified by manufacturer of roofing product. However, Section R905.2.7 states, "For roof slopes from two units vertical in 12 units horizontal (17-percent slope), up to four units vertical in 12 units horizontal (33-percent slope), underlayment shall be two layers applied in the following manner. Apply a 19-inch (483 mm) strip of underlayment felt parallel to and starting at the eaves, fastened sufficiently to hold in place. Starting at the eave, apply 36-inch-wide (914mm) sheets of underlayment, overlapping successive sheets 19 inches (483 mm), and fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. For roof slopes of four units vertical in 12 units horizontal (33-percent slope) or greater, underlayment shall be one layer applied in the following manner. Underlayment shall be applied shingle fashion, parallel to and starting from the eave and lapped 2 inches (51 mm), fastened sufficiently to hold in place. Distortions in the underlayment shall not interfere with the ability of the shingles to seal. End laps shall be offset by 6 feet (1829 mm)."
4. Check for required overlap of roofing material according to product listing.
Standard: Almost all roofing materials such as shingles or roll type have overlap requirements. Various Tables in Chapter 9 list the maximum weather exposure for wood shingles or shakes, however, most manufactured materials specify a required overlap at joints.

Drywall nailing

1. Are the Jurisdiction's approved plans on site?
Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.
2. Check on proper thickness for ceiling drywall?

Standard: Table R702.3.5 provides the minimum thickness and application of gypsum board for walls or ceiling based on installation. In some conditions, footnote *d* of this table requires sag-resistant drywall when installed 24" center supports with water-based spray applied texture.
3. Nail size and center spacing? Screw size and center spacing?
Standard: Check for required connection details. <Insert Table R702.3.5.>
4. Double layers of drywall require separate inspections and different connection details.
Standard: If you install two layers of drywall to achieve a rated wall or ceiling, make sure that both layers are inspected prior to the next ply being installed.
5. Proper drywall installed depending upon location:

a) bathroom

Standard: Section R702.3.8 specifies the proper use for water-resistant gypsum backing board. Further in Section R702.3.8.1 Limitations are addressed.

<u>Landscaping and site work</u>
1. Are the Jurisdiction's approved plans on site?
Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.
2. Final site survey review. An As-Built Drawing may be required for zoning or flood hazard locations.
Standard: Zoning may need to certify that the house is exactly where it should be with a survey that you provide them. Elevation of finish floor above flood hazard level must be certified per Section R324.1.9 that states, "A registered design professional shall prepare and seal documentation of the elevations specified in Section R324.2 or R324.3." Did this get approved yet?
3. Landscaping according to approved plan and zoning conditions?
Standard: There may be jurisdictional regulations for landscaping. Do field conditions match approved plans?
4. Final grading check?
Standard: Do slope and final grade match approved plans? Note that Section R401.3 requires surface drainage to be diverted to a storm sewer conveyance or other approved point of collection so as to not create a hazard. Lots shall be graded to drain surface water away from foundation walls. The grade shall fall a minimum of 6 inches (152 mm) within the first 10 feet (3048 mm).

<u>Final Inspection</u>
1. Are the Jurisdiction's approved plans on site?
Standard: The Jurisdiction's approved plans are generally required to be on site during inspections. Section R106.3.1 sets out the requirement that plans be on jobsite.

2. Architectural and structural aspects
Standards:

a. Verify that all other inspections are approved by inspector per Section R109.
b. Check the outside grade. Does it allow surface drainage away from building per Section R401.3.
c. Are outside and interior guardrails and handrails installed to proper height and opening? (Guardrail: 36" high and center spacing so that a 4" ball cannot pass through; Handrail: 34-38" above the nosing of tread) per Section R312.
d. Where required, is safety glazing identified per section R308.
e. Check for fireplace safety: Required hearth extension? Separation from combustibles? Shut off valve in proper location? Is every part of fireplace and chimney installation per Chapter 10 and manufacturer's instructions.

f. Is solid core door between garage and house installed per Section R309.2?
g. Energy efficiency stamp for windows and doors installed per Section N1101.5.
h. Permanent address installed on building or property per Section R321 that states, “Approved numbers or addresses shall be provided for all new buildings in such a position as to be plainly visible and legible from the street or road fronting the property.”
i. Is fireplace spark arrestor installed on chimney per Section R1003.9.1.
j. Are attic vents the proper size based on roof size per Section R806.
k. Are any required ramps built to the proper slope per Section R311.6 that states in part: “Ramps shall have a maximum slope of one unit vertical in twelve units horizontal (8.3-percent slope).

3. Plumbing Installation
Standards:

a. Are DWV cleanouts installed where required according to Section P3005.2.
b. Is there adequate water pressure per Section P2903.3.
c. Are water saving fixtures installed? (1.6 gallon water closets, etc). These are established in Table P2903.2.
d. Are all fixtures properly caulked? The installation of fixtures shall conform to the following: Where fixtures come in contact with walls and floors, the contact area shall be water tight.” per Section P2705.1 item #3.
e. Temperature and pressure relief lines installed and functional per Section P2803.
f. All fixtures installed and operational per Section P2705.1, item #4 that states, “Plumbing fixtures shall be usable.”
g. Pressure relief valves are installed with expansion tanks per Section P2803.3.
h. Vents through the roof are protected from freezing per Section PP3101.4.
i. If backwater valve is required, verify that it is installed and operational per Section P3008.
j. Water heater in location where leakage is likely to damage verify that a pan is installed per Section P2801.5.
k. Check for proper termination of condensate drain line(s) per Section M1411.3.

4. Electrical
Standards:

a. GFCI devices and circuit breakers installed and operational per Section E3802.
b. Arc Fault devices and circuit breakers installed in bedrooms and operational per Section E3802.12.
c. Check for polarity and for open grounds of outlets per Section E3303.2.
d. Check that circuits in panels identified per Section E3506.4.
e. Check that smoke detectors functional and installed where they are required per Section R313.
f. Check that lights and fixtures are installed properly and functioning per Section E3303.2.
g. Is there adequate clearance, access and working space provided? Including panelboards per Figure E3305.1.
h. Check for proper grounding and bonding of panel box(es) per Section E3508, E3509, and E3510
i. Check lighting in closets protected from shelves per Figure E3903.11.
j. Check that Service is provided with a means of disconnect per Section E3501.6.

5. Mechanical
Standards:

a. Check that equipment installed and functioning properly per Section M1307.1.

b. Check gas appliances for required shut off valves per Section G2420.
c. Check that vent connectors are installed properly per Section G2426.2 Check clearance to combustibles.
d. Verify that equipment installed in garage is protected from vehicle damage per Section M1307.3.1.
e. Verify adequate combustion air provided for gas equipment per Section G2407.
f. Check that exhaust vents terminate as required by Section G2427.5.3.
g. Check for maximum length for flexible gas connectors (6' for ranges and dryers – 3' for others) per Section G2422.1.
h. Verify that equipment in garage elevated so that source of ignition is 18" above finish floor per Section G2408.2.
i. Does all mechanical equipment have proper listing and labeling per Section G2403.3.
j. Is condensate drain connected and operational per Section M1411.3.
k. Is exterior mounted heat pump installed on 3" support per Section M1403.2?
l. Does all equipment in attic have the required:
    - Access and working clearance per Section M1305.1.3.
    - Working platform per Section M1305.1.3.
    - Ramp access per Section M1305.1.3.
    - Service outlets per Section M1305.1.3.1
    - Switched light per Section M1305.1.3.1
    - Means of disconnect within sight per Section E4001.5.

6. Review of Final Structural Reports
Standards:
a. Special Inspections (if any) reports must be approved by the inspecting engineer and Chapter 17 IBC.

7. Zoning
Standards:
a. Is final wall check distance to P/L approved?
b. Is final building height check approved?
c. Are all color or appearance requirements met?
d. Is all landscaping complete and approved by zoning inspector?